BRANDON, RONALD A. 1967. *Gyrinophilus palleucus*. Catalogue of American Amphibians and Reptiles, p. 32.

Gyrinophilus palleucus McCrady
Tennessee cave salamander

Gyrinophilus palleucus McCrady, 1954:201–205. Type-locality, "Sinking Cove Cave, Franklin County, Tennessee." Holotype, female, Chicago Nat. Hist. Mus. 72585, collected January 1944 by E. McCrady.
Pseudotriton palleucus: A. P. Blair, 1961:499. New combination.

• CONTENT. Three subspecies are recognized: *palleucus*, *necturoides*, and *gulolineatus*.

• DEFINITION and DIAGNOSIS. This is a stout-bodied perennibranch salamander with a stream-type larval form (Valentine & Dennis, 1964), five toes on the hind feet, small eyes, a broad head with spatulate snout, and 17–19 costal grooves. Larvae of this species differ from those of *Gyrinophilus porphyriticus* in having smaller eyes and more teeth. In *G. palleucus* the diameter of the cornea is ¼–⅙ the distance from the snout tip to the anterior corner of the eye; in *G. porphyriticus* it is ⅓ or more. Prevomerine, premaxillary, and pterygoid tooth counts are consistently higher than in larval *G. porphyriticus*, averaging 25, 32, and 20 in *G. palleucus* compared to 16, 26, and 14 for larval *G. porphyriticus*. Larval *Pseudotriton* have large eyes (corneal diameter more than ½ the distance from the snout tip to the anterior corner of the eye), 16–17 costal grooves, a nonspatulate snout, and even fewer teeth than *G. porphyriticus*.

• DESCRIPTIONS. A detailed description of *G. p. palleucus* is given by McCrady (1954). Descriptions of *G. p. necturoides* and *G. p. gulolineatus* are available in Lazell & Brandon (1962) and Brandon (1965) respectively. The species is known to range from 20–206 mm in total length (to 136 mm snout to vent). According to Dent & Kirby-Smith (1963), sexual maturity occurs between 70 and 100 mm snout-vent length in *G. p. palleucus*.

The intensity of dorsal pigmentation ranges from pale, nearly albinistic, in *G. p. palleucus* to dark brown in the other two subspecies. Immature specimens of *G. p. necturoides* and *G. p. gulolineatus* are uniformly dark brown dorsally; larger and apparently sexually mature individuals have spots that are darker than the brown ground color.

Because the species is neotenic, it is similar to larval *G. porphyriticus* in body form: it has 3 pairs of gill rami supporting numerous slender filaments; no eyelids; a caudal fin ending dorsally above the vent and ventrally at the vent; labial folds; and a well-marked sensory pore system on the head and body. The eyes look unusually small; the snout is broad and turned up at the tip. Distinct costal grooves range from 17 to 19 in number between the limbs, though individuals with 19 are few.

Descriptions of specimens of *G. p. palleucus* in various stages of induced metamorphosis are given by Dent & Kirby-Smith (1963).

The eggs and newly hatched larvae are not yet described.

• ILLUSTRATIONS. A drawing of *G. p. palleucus* is found in McCrady (1954), a photograph of *G. p. necturoides* in Lazell & Brandon (1962) and photographs of *G. p. gulolineatus* in Brandon (1965, 1966). Conant (1958:pl. 37) offers an overly pink illustration of *G. p. palleucus*. Photographs of specimens in various stages of induced metamorphosis are available in Dent & Kirby-Smith (1963). The spermatophore is illustrated by Lazell & Brandon (1962).

• DISTRIBUTION. This species is found in the southern Cumberland Plateau of southern central Tennessee and northeastern Alabama, in the Tennessee River Valley of Roane and McMinn counties, Tennessee, in the Nashville Basin southeast of Nashville, Tennessee, and in the Highland Rim of northwestern Alabama. The species is restricted to subterranean waters, and the full range is not known.

• FOSSIL RECORD. None.

• PERTINENT LITERATURE. Few papers treat this species. There are several reports of the induction of metamorphosis: Dent, *et al.*, 1955; Blair, 1961; Lazell & Brandon, 1962; Dent & Kirby-Smith, 1963. The last of these is the most extensive; it discusses iodine metabolism in the thyroid gland, growth under laboratory conditions, and gonadal differentiation in relation to body length.

Lazell & Brandon (1962) compare *G. p. necturoides* with *G. p. palleucus*; Brandon (1965) compares *G. p. gulolineatus* with the other two subspecies. A comprehensive review is presented by Brandon (1966).

• REMARKS. According to McCrady (1954), long exposure to light does not affect the development of the eyes or the pigment.

A cursory glance at the distribution of the subspecies of *G. palleucus* might lead to confusion. The *G. p. palleucus* localities appear to lie geographically between *G. p. necturoides* and the zone of intergradation between these two subspecies. Actually, the drainage system in which the intergrades occur empties into the Tennessee River between drainages in which the two subspecies are found (see Brandon, 1965).

Although *G. palleucus* is not yet reported from the caves of Lookout Mountain near the juncture of Alabama, Georgia, and Tennessee, two early reports, usually assumed to be of *G. porphyriticus*, may be individuals of this species (see Hay, 1903; Zipperlen, 1884).

• ETYMOLOGY. The name *palleucus* describes the pale coloration and derives from the Greek *palleucus*, signifying "all white." The name *necturoides* is from Greek and refers to the similarity in dorsal coloration between this form and *Necturus*. The name *gulolineatus* is from the Latin *gula*, "throat," and *lineatus*, "marked with lines," and refers to the striped throat diagnostic of this form.

1. *Gyrinophilus palleucus palleucus* McCrady

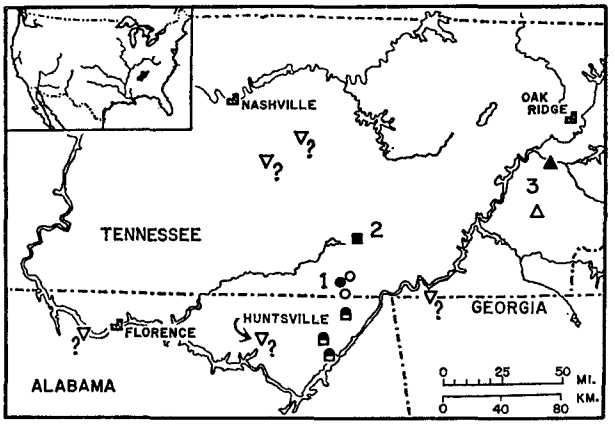
Gyrinophilus palleucus McCrady. See species account.
Gyrinophilus palleucus palleucus: Lazell & Brandon, 1962:300.

• DIAGNOSIS. Adults of this subspecies differ from adult *G. p. necturoides* and *G. p. gulolineatus* in lacking the dark, spotted, dorsal coloration. Both juvenile and adult *G. p. palleucus* are uniformly and lightly pigmented dorsally; juveniles of the other two subspecies are uniformly pigmented but considerably darker.

2. *Gyrinophilus palleucus necturoides* Lazell & Brandon

Gyrinophilus palleucus necturoides Lazell & Brandon, 1962:301–305. Type-locality, "Big Mouth Cave, near Pelham, Grundy County, Tennessee." Holotype, Mus. Comp. Zool. 34100, collected 29 April 1961 by J. D. Lazell, Jr.

• DIAGNOSIS. *G. p. necturoides* differs from *G. p. gulolineatus* in lacking a dark stripe on the throat and in usually having 19 trunk vertebrae (usually 18 in *G. p. gulolineatus*). From *G. p. palleucus* it differs in having a dark spotted dorsum in adults and uniformly darker juveniles.



MAP. Solid symbols mark type-localities, open symbols indicate other localities. Half-closed symbols indicate localities of intergradation between 1 and 2; questioned symbols indicate specimens or records of uncertain status.

• REMARKS. The dark dorsal spots of this and the next subspecies tend to be obscured by the uniformly dark ground color in preserved individuals.

3. *Gyrinophilus palleucus gulolineatus* Brandon

Gyrinophilus palleucus gulolineatus Brandon, 1965. Type-locality, "Berry Cave, Roane County, Tennessee." Holotype, female, Field Mus. Nat. Hist. 142327, collected 10 July 1963 by R. A. Brandon and J. E. Huheey.

• DIAGNOSIS. A dark stripe on the throat distinguishes this subspecies from the others. It also differs from *G. p. palleucus* in having a dark, spotted dorsum, and from *G. p. necturoides* in usually having one less vertebra (usually 18, occasionally 19 in *G. p. gulolineatus*; usually 19, occasionally 20 in *G. p. necturoides*).

COMMENT

Available information does not permit allocation of specimens of "uncertain status" (see map) to one of the described subspecies. These specimens are best listed simply as *Gyrinophilus palleucus*. Cooper (personal communication) is preparing a report on the locality in northwestern Alabama. The record for Huntsville, Alabama is based on sight records (Cooper, 1966 and personal communication). Brandon is studying specimens collected by Thomas C. Barr, Jr., in the Nashville Basin.

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Issued 17 March 1967. Primary editor for this account, James D. Anderson. Publication is supported by National Science Foundation grant G24231. American Society of Ichthyologists and Herpetologists.